

# Notice of Allowability

Application No.

10/767,730

Examiner

Merilyn P. Nguyen

Applicant(s)

BIRDWELL ET AL.

Art Unit

2163

## -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed 02/09/2007 and the Interview dated April 19, 2007.
2. ☒ The allowed claim(s) is/are 1-4, 6-14, 24, 25 and 27-34.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

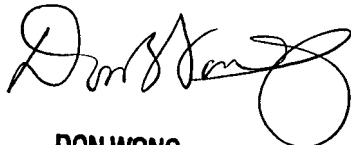
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material

5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_



**DON WONG**  
**SUPERVISORY PATENT EXAMINER**

### **DETAILED ACTION**

1. In response to the communication dated 02/09/2007 and 04/19/2007, claims 1-4, 6-14, 24, 25 and 27-34 are active in this application as the result of the cancellation of claims 5, 15-23 and 26 and the addition of claims 32-34 and in condition for allowance.
2. This application is a DIV of 09/671,304 filed 09/28/2000 now patent number 6,741,983 which claims benefit of 60/156,452 filed 09/28/1999.

### ***Response to Amendment***

3. New sheets of Drawing submitted on 02/09/2007 have been acknowledged and considered

### ***Examiner's Amendment***

4. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Thomas H. Jackson, Reg. No. 29,808 on April 19, 2007.

The application has been amended as follows:

- a. Amendment to the Abstract of the disclosure:

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A tree-structured index to multidimensional data is created using [[naturally]] occurring patterns and clusters within the data which permit efficient search and retrieval strategies in a database of DNA profiles. A search engine utilizes hierarchical decomposition of the database by identifying clusters of similar DNA profiles and maps to parallel computer architecture, allowing scale up past previously feasible limits. Key benefits of the new method are logarithmic scale up and parallelization. These benefits are achieved by identification and utilization of [[naturally]] occurring patterns and clusters within stored data. The patterns and clusters enable the stored data to be partitioned into subsets of roughly equal size. The method can be applied recursively, resulting in a database tree that is balanced, meaning that all paths or branches through the tree have roughly the same length. The method achieves high performance by exploiting the natural structure of the data in a manner that maintains balanced trees. Implementation of the method maps [[naturally]] to parallel computer architectures, allowing scale up to very large databases.

b. Amendments to the claims:

Claim 1 (Currently Amended) A computer-implemented method of partitioning data records in a computer into groups, comprising the steps of:

- (a) defining a function of a distribution of values of a designated variable associated with the data records, wherein the function comprises a combination of measures of entropy and adjacency, [[one of the measures]] adjacency being weighted by a weighting factor;
- (b) partitioning the values of the designated variable into two or more groups, wherein a value of the function is determined by applying an optimization procedure; and

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(c) assigning a data record to a group according to the values of the designated variable.

Claim 5 (Canceled)

Claims 15-23 (Canceled)

Claim 24 (Currently Amended) A computer-implemented method of partitioning data records of a database in a computer, wherein the database is indexed using a tree of nodes, wherein the tree of nodes comprises a root node which is connected to two or more branches originating at the root node, wherein each branch terminates at a node, wherein each node other than the root node is a non-terminal node or a leaf node, wherein each non-terminal node is connected to two or more branches originating at the non-terminal node and terminating at a node, wherein the tree-structured index comprises one or more [[tests]] queries associated with each non-terminal node, said method comprising the steps of:

(a) identifying [[naturally]] occurring sets of clusters in the data records of the database;

(b) defining for each identified set of clusters a query that evaluates one of a Boolean expression or a decision tree and assigns each data record within the set of clusters,

wherein said queries are determined by a combination of measures of entropy and

adjacency, adjacency being weighted by a weighting factor; and

(c) associating each query defined in step (b) with a non-terminal node and an associated set of clusters identified [[defined]] in step (a), and associating with each cluster within

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the set of clusters one branch originating at the non-terminal node, said branch forming part of one or more paths leading to leaf nodes comprising the data records assigned to the cluster by the query.

Claim 26 (Canceled)

***Reason for Allowance***

5. The following is an examiner's statement of reason for allowance:

None of the references of record Sjolander (US Patent No. 6,128,587) teaches or suggests the claimed (Claim 1) invention having, in addition to the other limitations in the claim, the limitation of defining a function of a distribution of values of a designated variable associated with the data records, wherein the function comprises a combination of measures of entropy and adjacency, adjacency being weighted by a weighting factor.

None of the references of record Sjolander (US Patent No. 6,128,587) teaches or suggests the claimed (Claim 24) invention having, in addition to the other limitations in the claim, the limitation of defining for each identified set of clusters a query that evaluates one of a Boolean expression or a decision tree and assigns each data record within the set of clusters, wherein said queries are determined by a combination of measures of entropy and adjacency, adjacency being weighted by a weighting factor.

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Dependent claims 2-4, 6-14, 25 and 27-34 are allowable because they depend from claims 1 and 24.

6. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

#### *Conclusion*

7. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Caldwell U.S Patent No. 6,959,300 discloses data compression method and apparatus.

Dom U.S Patent No. 6,584,456 discloses model selection in machine learning with applications to document clustering.

Amir Ben-Dor and Zohar Yakhini disclose, "Clustering Gene Expression Patterns", 1999.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Merilyn P Nguyen whose telephone number is 571-272-4026.

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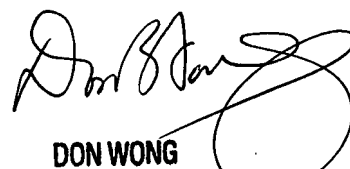
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on 571-272-1834. The fax phone numbers for the organization where this application or proceeding is assigned are 571-273-8300 for regular communications and 703-746-7240 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.



MN

April 19, 2007



**DON WONG**  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100